

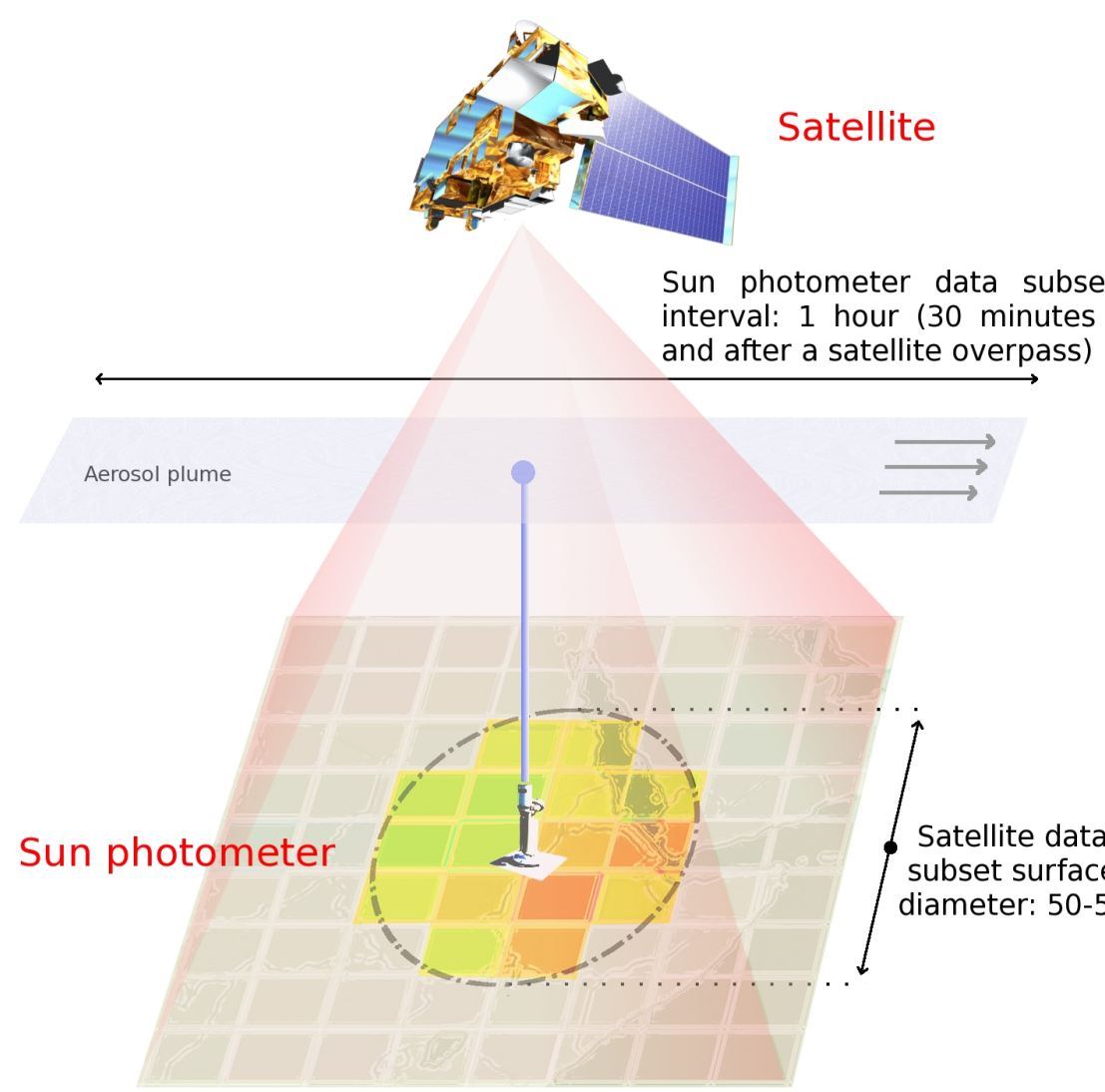
# Cross-characterization of aerosol properties from multiple spaceborne sensors facilitated by regional ground-based observations

Maksym.Petrenko@nasa.gov (ESSIC, University of Maryland), Charles Ichoku, Gregory Leptoukh (NASA Goddard Space Flight Center), AG Giovanni team

## Abstract

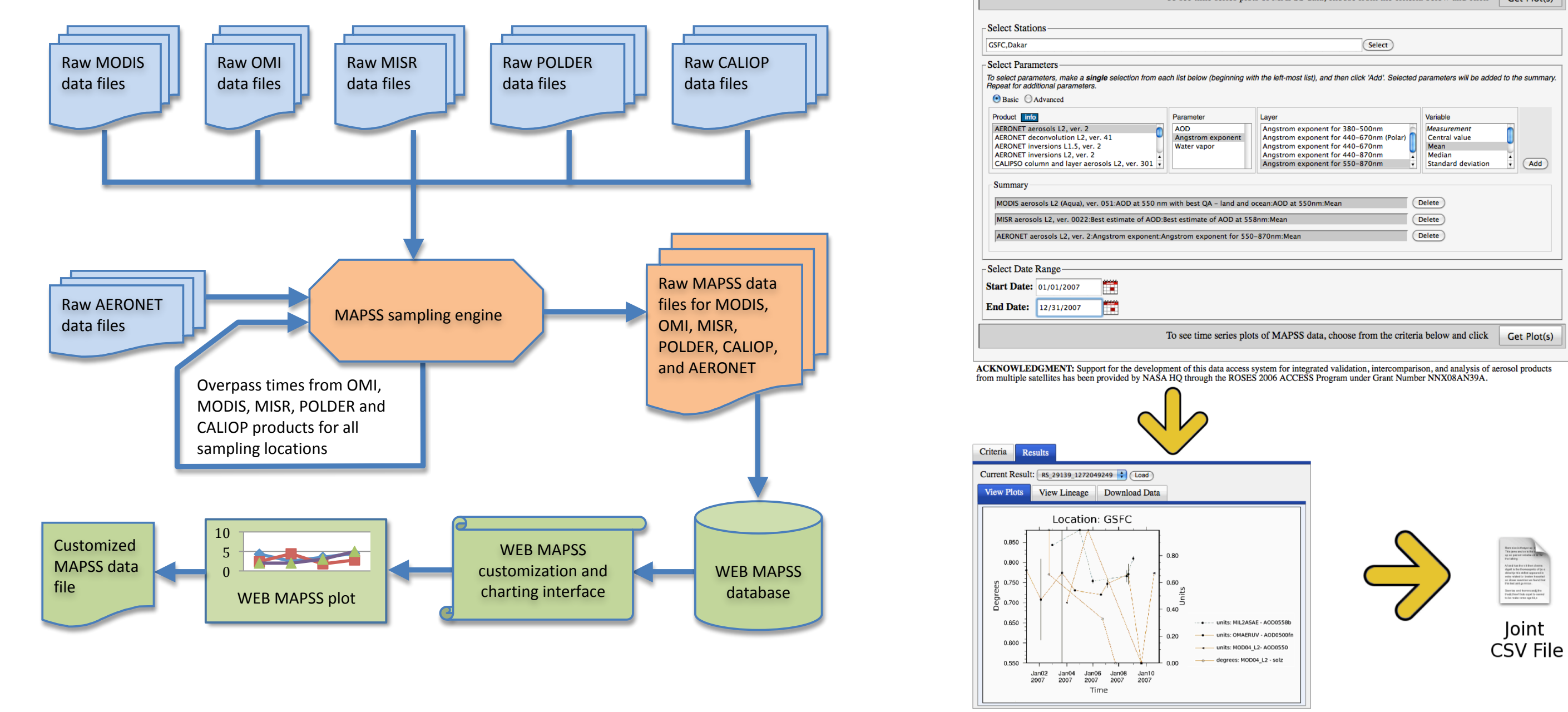
Aerosol observations from space have become a standard source for retrieval of aerosol properties on both regional and global scales. Indeed, the large number of currently operational spaceborne sensors provides for unprecedented access to the most complete set of complimentary aerosol measurements ever to be available. Nonetheless, this resource remains underutilized, largely due to the discrepancies and differences existing between the sensors and their aerosol products. To characterize the inconsistencies and bridge the gap that exists between the sensors, we have designed and implemented an online Multi-sensor Aerosol Products Sampling System (MAPSS) that facilitates the joint sampling of aerosol data from multiple sensors. MAPSS consistently samples aerosol products from multiple spaceborne sensors using a unified spatial and temporal resolution, where each dataset is sampled over Aerosol Robotic Network (AERONET) locations together with coincident AERONET data samples. In this way, MAPSS enables a direct cross-characterization and data integration between aerosol products from multiple sensors. Moreover, the well-characterized co-located ground-based AERONET data provides the basis for the integrated validation of these products.

## MAPSS framework



- Sample data from multiple sensors over uniform areas of 55km centered around AERONET sun photometer ground stations
- Sample AERONET data within  $\pm 30$  minutes of each overpass of the satellites
- Report a range of statistics characterizing the samples, including mean, mode, standard deviation, and key parameters of a plane or a line fitted to the sample

## Integrated on-line system



- Using the MAPSS framework, the supported data products are sampled daily and archived online at <http://modis-atmos.gsfc.nasa.gov/MAPSS/> in a simple unified comma-separated format (CSV), eliminating the need to learn the individual file format of each aerosol product and to write custom file handling software
- Giovanni-based WEB interface (WEB MAPSS) has been developed to provide a convenient customized access to the data, with on-line plotting and data export capabilities

## Supported products

### AERONET

Products: AOT, SDA, INV  
Sites: 660 (currently)  
Data periods: Varies with sites

### MODIS Terra and MODIS Aqua

Products: MOD04, MYD04, MOD05, MYD05  
Satellites: Terra (MOD) and Aqua (MYD)  
Resolution: 1x1 km, 5x5 km, 10x10 km  
Data period: Jan 2000- (MYD) and Jul 2002-(MOD)  
Equator crossing: 10:30AM (MOD) and 1:30PM (MYD)

### MISR

Products: MIL2ASAE  
Satellites: Terra  
Resolution: 17.6x17.6 km  
Data period: Jan 2000-  
Equator crossing: 10:30AM

### OMI

Products: OMAERUV  
Satellites: Aura  
Resolution: 13.7x23.7 km  
Data period: Oct 2004-  
Equator crossing: 1:38PM

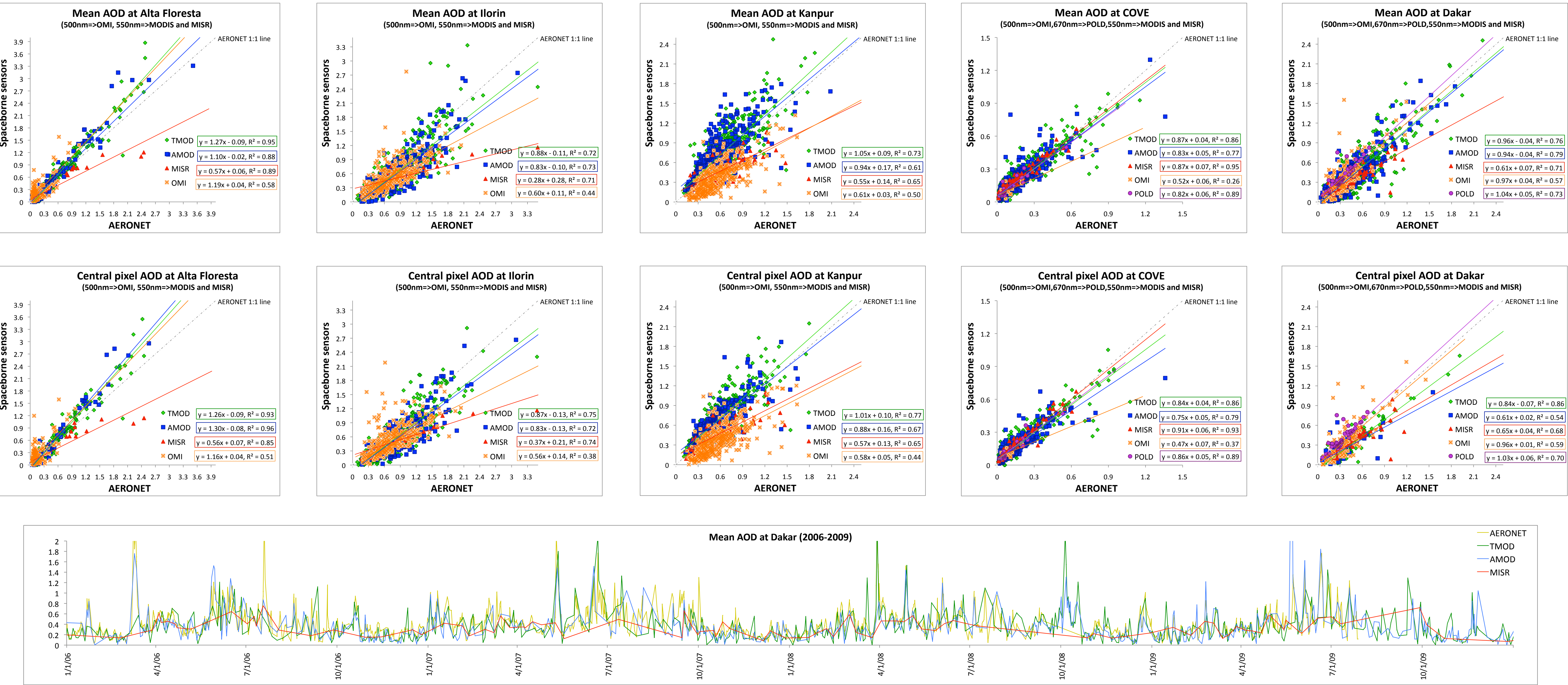
### CALIOP

Products: 05kmALay  
Satellites: CALIPSO  
Resolution: 5x5 km  
Data period: Jun 2006-  
Equator crossing: 1:32PM

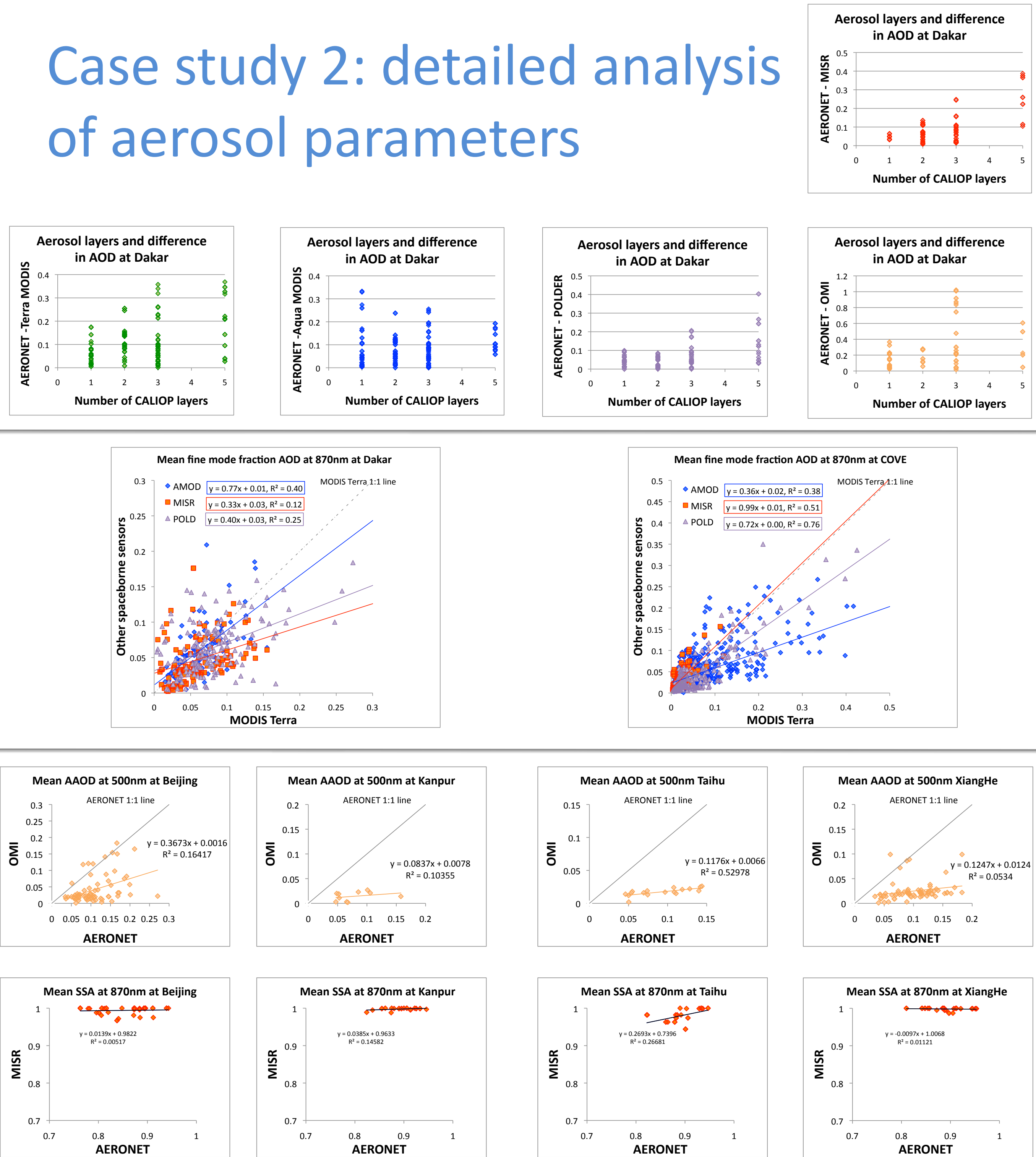
### POLDER

Products: P[1-3]L2TLGC, P[1-3]L2TOGC  
Satellites: ADEOS (1), ADEOS-2 (2), Parasol (3)  
Resolution: 19x19 km  
Data period: Oct 1996-Jun 1997 (1), Apr 2003-Oct 2003 (2), Mar 2005- (3)  
Equator crossing: 1:30PM

## Case study 1: AOD correlation between AERONET and spaceborne sensors



## Case study 2: detailed analysis of aerosol parameters



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